

What is claimed is:

1. A mobile communication system capable of selecting any one of a plurality of transmission modes used for data transmission of a unit of block between a base station controlled by a base station control apparatus and a mobile station, comprising:  
5       detecting means that is provided in said mobile station and detects occurrence of a receiving error of a unit of block in said data transmission; and  
          switching selecting means for switching said transmission  
10   modes based on the occurrence of said receiving error to be detected by said detecting means.
2. The mobile communication system according to claim 1,  
      wherein said switching selecting means is configured to  
      switch said transmission mode to a mode slower than a current  
15   mode when detection of the occurrence of said receiving error by said detecting means reaches n times (n is an integer equal to or more than one).
3. The mobile communication system according to claim 1,  
      wherein said switching selecting means is configured to  
20   switch said transmission mode to a mode faster than a current mode when detection of successful receipt of said data transmission by said detecting means continues for m times (m is an integer larger than n).
4. The mobile communication system according to claim 1,

wherein said switching selecting means is configured to switch said transmission mode to a mode faster than a current mode when a receiving error rate within a predetermined time set in advance becomes a predetermined value or less.

5 5. The mobile communication system according to claim 3,  
wherein said switching selecting means is configured to determine switching to said faster mode according to a target block error rate in said data transmission.

6. The mobile communication system according to claim 1,  
10 wherein said switching selecting means is configured to switch said transmission mode to a mode slower than a current mode when a block error rate in a predetermined first number of blocks set in advance is larger than a first predetermined block error rate set in advance and switch said transmission  
15 mode to a mode faster than the current mode when a block error rate in a second predetermined number of blocks set in advance (second predetermined number of blocks > first predetermined number of blocks) is smaller than a second predetermined block error rate set in advance and to a mode slower than the current  
20 mode when the block error rate in the second predetermined number of blocks is equal to or larger than a third predetermined block error rate set in advance.

7. The mobile communication system according to claim 6,  
wherein said switching selecting means is configured to  
25 determine said first predetermined number of blocks, said second

predetermined number of blocks, said first predetermined block error rate, said second predetermined block error rate and said third predetermined block error rate according to a target block error rate in said data transmission.

5 8. The mobile communication system according to claim 1,  
wherein said switching selecting means is configured to  
switch said transmission mode to a mode slower than a current  
mode when a block error rate in predetermined first time set  
in advance is larger than a first predetermined block error rate  
10 set in advance and switch said transmission mode to a mode faster  
than the current mode when a block error rate in second  
predetermined time set in advance (second predetermined time  
> first predetermined time) is smaller than a second predetermined  
block error rate set in advance and to a mode slower than the  
15 current mode when the block error rate in the second predetermined  
time is equal to or larger than a third predetermined block error  
rate set in advance.

9. The mobile communication system according to claim 8,  
wherein said switching selecting means is configured to  
20 make the predetermined time for the condition for switching said  
transmission mode to said faster mode shorter than the  
predetermined time for the condition for switching said  
transmission mode to said slower mode.

10. The mobile communication system according to claim 9,

wherein said switching selecting means is configured to make a rate of the predetermined time for switching said transmission mode to said faster mode and the predetermined time for switching said transmission mode to said slower mode equal  
5 to a ratio of data transmission speeds.

11. The mobile communication system according to claim 8,  
wherein said switching selecting means is configured to determine said first predetermined time, said second predetermined time, said first predetermined block error rate,  
10 said second predetermined block error rate and said third predetermined block error rate according to a target block error rate in said data transmission.

12. The mobile communication system according to claim 1,  
wherein said switching selecting means is disposed any one  
15 of said base station control apparatus, said base station and said mobile station.

13. A transmission mode switching method capable of selecting any one of a plurality of transmission modes used for data transmission of a unit of block between a base station controlled  
20 by a base station control apparatus and a mobile station, comprising:

a first step of detecting occurrence of a receiving error of a unit of block in said data transmission in said mobile station;  
and

a second step of performing switching of said transmission modes based on the occurrence of said receiving error to be detected in said first step.

14. The transmission mode switching method according to claim  
5 13,

wherein said second step is arranged to switch said transmission mode to a mode slower than a current mode when detection of the occurrence of said receiving error in said first step reaches  $n$  times ( $n$  is an integer equal to or more than one).

- 10 15. The transmission mode switching method according to claim 13,

wherein said second step is arranged to switch said transmission mode to a mode faster than a current mode when detection of successful receipt of said data transmission in  
15 said first step continues for  $m$  times ( $m$  is an integer larger than  $n$ ).

16. The transmission mode switching method according to claim 13,

wherein said second step is arranged to switch said  
20 transmission mode to a mode faster than a current mode when a receiving error rate within a predetermined time set in advance becomes a predetermined value or less.

17. The transmission mode switching method according to claim 15,

wherein said second step is arranged to determine switching to said faster mode according to a target block error rate in said data transmission.

18. The transmission mode switching method according to claim

5 13,

wherein said second step is arranged to switch said transmission mode to a mode slower than a current mode when a block error rate in a predetermined first number of blocks set in advance is larger than a first predetermined block error rate  
10 set in advance and switch said transmission mode to a mode faster than the current mode when a block error rate in a second predetermined number of blocks set in advance (second predetermined number of blocks > first predetermined number of blocks) is smaller than a second predetermined block error rate  
15 set in advance and to a mode slower than the current mode when the block error rate in the second predetermined number of blocks is equal to or larger than a third predetermined block error rate set in advance.

19. The transmission mode switching method according to claim

20 18,

wherein said second step is arranged to determine said first predetermined number of blocks, said second predetermined number of blocks, said first predetermined block error rate, said second predetermined block error rate and said third predetermined block  
25 error rate according to a target block error rate in said data transmission.

20. The transmission mode switching method according to claim  
13,

wherein said second step is arranged to switch said  
transmission mode to a mode slower than a current mode when a  
5 block error rate in predetermined first time set in advance is  
larger than a first predetermined block error rate set in advance  
and switch said transmission mode to a mode faster than the current  
mode when a block error rate in second predetermined time set  
in advance (second predetermined time > first predetermined time)  
10 is smaller than a second predetermined block error rate set in  
advance and to a mode slower than the current mode when the block  
error rate in the second predetermined time is equal to or larger  
than a third predetermined block error rate set in advance.

21. The transmission mode switching method according to claim  
15 20,

wherein said second step is arranged to make the  
predetermined time for the condition for switching said  
transmission mode to said faster mode shorter than the  
predetermined time for the condition for switching said  
20 transmission mode to said slower mode.

22. The transmission mode switching method according to claim  
21,

wherein said second step is arranged to make a rate of the  
predetermined time for switching said transmission mode to said  
25 faster mode and the predetermined time for switching said

transmission mode to said slower mode equal to a ratio of data transmission speeds.

23. The transmission mode switching method according to claim 20,

5        wherein said second step is arranged to determine said first predetermined time, said second predetermined time, said first predetermined block error rate, said second predetermined block error rate and said third predetermined block error rate according to a target block error rate in said data transmission.

10    24. The transmission mode switching method according to claim 13,

      wherein said second step is disposed any one of said base station control apparatus, said base station and said mobile station.

15    25. A recording medium having recorded therein a program of a transmission mode switching method of a mobile communication system capable of selecting any one of a plurality of transmission mode used for data transmission of a unit of block between a base station controlled by a base station control apparatus and  
20    a mobile station,

      wherein the program causes a computer to execute processing for detecting occurrence of a receiving error of a unit of block in said data transmission in said mobile station and processing for performing switching of said transmission mode based on the  
25    occurrence of said receiving error to be detected.